

## **Multiplication and Division**

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**OVERVIEW:** The importance of Mathematics in elementary school is important for the future of our country. Mathematics is incorporated into other school curriculums such as Social Studies and Science. Mathematics is a skill that children and adults can use for the rest of their lives. People think if they have a calculator to do the math for them, they will be able to solve any and all math problems that come before them. Calculators are great tools that can be useful in solving many problems, but if a child or an adult can not complete basic math problems such as addition, subtraction and multiplication or division there must be concerns. In this paper I will be focusing on how students in grades third, fifth, sixth and seventh learn how to work on multiplication and division functions. Everyday Mathematics offers four methods for dealing with multiplication: The Partial Product Method, Lattice Multiplication Method, Egyptian Multiplication Method, and the Short Method. The Lattice Multiplication Method and Partial Product Methods are taught during the students third grade year. These skills are learned in third grade and continued in fourth. When the students reach fifth and sixth grade they are taught the Egyptian Multiplication Method and a Short Method. Why are these methods the best methods for the students to be taught? Do students seem to pick up on these new methods easier than the old traditional way of performing multiplication and division? Being a sixth and seventh grade math teacher I work with students that have gone through Everyday Math and some traditional mathematics. The sixth and seventh grade curriculum deals with a great amount of multiplication and division. The school I work in also has a very transient population. This means that some of the students that enrolled in the school have not worked with Everyday Math. The students' first experience with multiplication deals with an introduction to Multiples of Equal Groups. Another important skill that is taught in third grade is division. Everyday Mathematics offers two methods for division: Partial Quotients Method and Column Division Method. The Partial Quotients Method might be described as successive

approximation. Multiplication and division play an important part in a child's educational processing of Mathematics, without this skill most students are lost.

**RATIONALE:** As I began the Teachers Institute course on Looking at Everyday Mathematics, I knew there would be many avenues I could explore to better myself in the elementary curriculum. Everyday Mathematics was created by the University of Chicago and was designed to improve school mathematics in grades K through 12. We as teachers should be willing to learn how the Elementary and Secondary schools teach and how their students learn to solve mathematics problems. Everyday Mathematics has a spiral level of understanding simple exploration to an advanced understand of a concept. Students are frequently asked to explain how they came to get their answer to a particular question. This means that students are introduced to a particular concept and work on that concept for a few days and then move on to another concept. Each concept builds on the other concept. If students work on multiplication for a couple of days they will then move on to another concept using multiplication, but not the same concept they had been working on earlier. Students in this curriculum do not learn mastery.

As the student's third grade school year begins they review basic concepts such as addition and subtraction along with concepts they learned in second grade. Students are introduced to multiplication and division at the same time. The description of fact families works together. Because these concepts are introduced together students are able to see the connection between them. Multiplication and Division are introduced by solving multiplication and division stories. These stories are used to teach the student how to use multiplication. As the students work on these stories the teacher will discuss factors and multiples. After the students have completed their stories they begin working on division. The students interpret a remainder in division and work for an understanding of what the remainder is used for and why they have a remainder. Again students are asked often to explain their answers, this is how the teacher will check for an understanding of a particular concept. As the students continue on their spiral quest of multiplication and division they are introduced to the concept of using arrays. Using an array gives the student an understanding of how multiplication works. Students are given paper with a number of dots. The students then connect the dots to form a given design. The designs are usually in the shape of a rectangle or squares. The example below shows an array and how it is used

Rectangular array (5x2)

. . . . .

Square array (4x4)

. . . . .



Students trace along the dotted lines to form their desired shape. As the students start at the first dot this is the number 0. As they move along they continue counting the next dot as 1, the student would continue until they needed to stop. The students are working on a number of concepts by using an array. A teacher may want to introduce the concepts of area and perimeter at this time. After the students use the arrays to model multiplication, they will then investigate the relationship between multiplication and division. Students will be taught how multiplication is the opposite of division. The concept of two-digit multiplication and division is also introduced. Everyday Mathematics offers four methods for dealing with multiplication: The Partial Product Method, Lattice Multiplication Method, Egyptian Multiplication Method, and the Short Method. Partial Product and Lattice Methods are introduced in the third grade curriculum. The Partial Product Method is an algorithm for multiplication. The Partial Product Method uses the bases of estimation of tens decomposition of each factor being used and forms product pairs. After the student has completed this task the products are added together. The Partial Product Method is a spiral content from the Partial Sums Method in addition. Below is an example of a Partial Product Method.

$$\begin{array}{r}
 83 \\
 *27 \\
 \hline
 80*20 \rightarrow 1600 \\
 80* 7 \rightarrow 560 \\
 3*20 \rightarrow 60 \\
 3* 7 \rightarrow 21 \\
 \hline
 2241
 \end{array}$$

As you look at the example of the Partial Product Method you will notice that addition problem is the product of the numbers of the digits in the factors. The students are using their estimation skills that were learned during their first and second grade years. The second concept of multiplication being taught at this time is The Lattice Method. Lattice multiplication is a series of boxes in which the student places one factor along the top of the box and the other along the right side of the box. A diagonal line divides each of the boxes. The digits are multiplied across the diagonals and their two-digit answer is placed in the box provided. The answers are then added along the diagonals and the answer is placed at the bottom of the diagonal.

If there is a need to carry a number that number will be placed in the above diagonal. Below is an example of how Lattice Multiplication works.

$  \begin{array}{r}  8 \quad 3 \\  +----+----+ \\   1 \ / 0 \ /  \\    \ / \   \ / \   \ 2 \\  2 \   \ / \ 6 \   \ / \ 6 \   \\  +----+----+ \\  \\   5 \ / 2 \ /  \\    \ / \   \ / \   \ 7 \\  2 \   \ / \ 6 \   \ / \ 1 \   \\  +----+----+ \\  4 \quad 1  \end{array}  $	<p>step 1: <math>2 \times 3 = 06</math></p> <p>step 2: <math>8 \times 2 = 16</math></p> <p>step 3: <math>7 \times 3 = 21</math></p> <p>step 4: <math>7 \times 8 = 56</math></p> <p>-remember when you are adding and carrying is involved. The number to be carried is placed the diagonal.</p>
<p>above</p>	
<p>= 2241</p>	

Everyday Mathematics offers two methods for division: Partial Quotients Method and Column Division Method. The Partial Quotients Method might be described as successive approximation. The teacher will work with some easy multiples of the divisor; say twice and five times the divisor. After this skill is worked on for a week student's are asked to complete more complicated problems. Remember that Everyday Mathematics works in a spiral concept. Student will revisit this concept again in the weeks to come. An example of a Partial Quotients Method is given below.

$  \begin{array}{r}  16) 1220 \\  - 800 \\  \hline  420 \\  - 320 \\  \hline  100 \\  - 80 \\  \hline  20 \\  - 16 \\  \hline  4  \end{array}  $	$  \begin{array}{r}  50 \\  20 \\  5 \\  1 \\  \hline  76  \end{array}  $	<p>answer is 76 R4</p>
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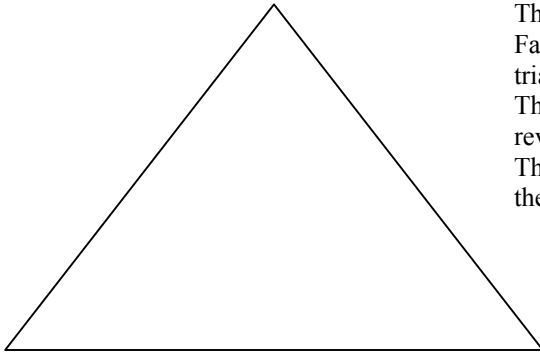
The column on the right side is where the students write their estimations. After the student has finished the problem the column on the right is added up to complete the answer. Students in Everyday Mathematics are not taught the traditional way of dividing. The only problem with the Partial Quotients Method is, if a student is having trouble multiplying the estimation skill will be off. This may take the student longer to complete the division problem. This is a good skill for students to learn. But, what is wrong with traditional division? This promotes the same concept, except the student is using their estimation skills. When the students complete their unit on estimation they will begin to use calculators to complete larger problems. As I mentioned earlier calculators are a great tool, but I feel students must know the basic skills of multiplication before they use the calculator to solve problems. As the students proceed through their unit they continue to review their basic facts of multiplication and division. Most students are given a Multiplication table to follow if they are having trouble with their facts. It is at this time when the students are introduced to Multiplying and Dividing with multiplies of 10, 100 and 1000 by one digit numbers. I feel this is a good concept for the students to learn, because the students are learning how to complete problems using the facts that they have learned through out the unit and this can help the students save time when they are working on larger problems. As the Unit on Multiplication and Division come to a close. The students are introduced to Multiplication and Division of decimal and fractions. These concepts are introduced in the third grade curriculum and focused on in the fourth grade curriculum. After the students have worked with fractions and decimals the students conclude their unit with a few lessons on ratios, proportions and percents.

As the students work through the Multiplication and Division Unit they will play a number of games. These games are used to make learning fun and promote active learning. Some of the games the students will play are: Multiplication Bingo, Multiplication Baseball, Multiplication Draw, Calculator Multiplication and Factor Bingo. As I review the games, I felt the best game was Multiplication Baseball. The students are given a set of dice and a chart to follow for the game. As the students roll the dice they multiply the two die together to create their product. The student will then check the chart to see the out come of their at bat. Each product is given a different out come. Below is look at what each out come may be:

- A product of 1-9 results in an out
- A product of 10-19 results in a single
- A product of 20-29 results in a double
- A product of 30-35 results in a triple
- And products of 36 results in a home run for that player.

Most teachers I spoke with feel that the students enjoy playing Multiplication Baseball, and it's a great way for students to practice their multiplication skills. Students also create something called a Factor Triangle. These triangles are another

excellent way for students to practice their multiplication and division skills. One side of the Factor Triangle may look like this:



The product is located at the top of the triangle.  
Factors for the product are located in each corner of the triangle.  
The student must cover the product or cover a factor to review.  
There are multiplication and divisions symbols located on the sides of triangle

The vocabulary words for this unit also gives the student a good foundation for their introduction to Multiplication and Division. All students are required to keep a working vocabulary list during their work in the Everyday Mathematics curriculum. Below is a list of the vocabulary the students will be learning during their study of Multiplication and Division. All students are required to keep a working vocabulary list during their work in the Everyday Mathematics curriculum.

**algorithm** A step-by-step set of instructions for solving a certain kind of problem

**array** A rectangular arrangement of objects in rows and columns.

**division** The operation used to solve equal-sharing or equal-grouping problems. It is used to find how a total amount can be separated into an equal numbers of groups, or into groups of equal size.

**estimate** A calculation of a general, rather than an exact, answer; an approximation of a number.

**Fact Triangles** Triangular cards that use the members of fact families for practice with addition/subtraction and multiplication/division facts. Two one-digit numbers and their sum or product (marked with an asterisk) appears in the corners of each triangle.

**factor of a number** A whole number that can be multiplied by another whole number to get the given number. A number that can be divided by a given number without having a remainder has *factors*

**factors** The numbers being multiplied in a multiplication number model. In the number model  $4 \times 3 = 12$ , 4 and 3 are the factors.

**facts table** A chart of rows and columns, also known as an Addition Table or a Multiplication Table, for use in finding addition and subtraction or multiplication and division facts.

**multiple** Repeated groups of the same amount. Multiples of a number are the products of that numbers and whole numbers.

**multiplication** The operation used to find the total number of things in several equal groups, or to find the number that is  $x$  times as many as another number.

**multiplication diagram** Used to represent numbers in which several equal groups are being considered together. The diagram has three parts: the number of groups, the number in each group, and the total number

**1-facts** The sum of any two 1-digit numbers where one of the numbers is one, such as  $6 + 1 = 7$ . If one is added to any number, or vice-versa, the result is always the next height number. Also, the product of any two 1-digit numbers where one of the numbers is one, such as  $1 \times 3 = 3$ . The product of 1 and any number is always equal to that number.

**power of a number** The product of factors, all of which are the same. For example,  $5^3$  (five to the third power, or  $5 \times 5 \times 5$ ) is another way to name 125.

**product** The result of doing multiplication. In the number model  $4 \times 3 = 12$ , 12 is the product.

**times** Multiplied by. “ $4 \times 6$ ” is read as “4 times 6” or “4 multiplied by 6”. This indicates how many equal groups are being considered together.

This is a very large unit on multiplication and division. If the teacher completes one Investigation a week it will take them roughly ten weeks to complete the unit. I think that students should be working on basic mathematics and the understanding of how they each relate to one another during their elementary school years, rather than give the students a vast overview of a number of different mathematics topics.

As these same students start fourth grade they will continue to work on their multiplication and division skills. In fourth the students will work on a Unit called Multiplication & Division; Number Sentences & Algebra. In this Unit the students will work on 10 lesson dealing with multiplication and division. To start this lesson on multiplication the teacher will pass out a copy of Master 6, this is the first 50-facts test the students will be taking. The teacher’s instructions are to collect the test and count the number right only up to the first mistake. Anything after the first mistake does not count. The students again will be practicing their multiplication and division skills by playing Baseball Multiplication. They will be following the same rules they did in fourth grade. The student will also review their facts for multiplication and division by using their fact triangles. During fourth grade the students will again learn about the dividend, divisor and the quotient. This is where

the students get their first introduction to two-digit multiplication. The students are introduced to two-digit multiplication by playing multiplication wrestling. Multiplication wrestling has the same concept as multiplication baseball. Pairs of students work together. Using a die or a set of cards. They draw random pairs of two-digit numbers and then form and add the partial products. E.g., if they draw 75 and 84 they compute and add  $70 \times 80 = 280$ ,  $5 \times 80 = 400$ ,  $5 \times 4 = 20$ . At this stage it is presented as a game, and is not explicitly connected to the multiplication problem  $75 \times 84$ . Also during the fourth grade the students will work on multiplying by the power of 10. This comes in Volume B. Again the student will only work on these facts and families for only a few weeks. Students are again required to keep a working vocabulary list. This list is for the students to look up words when they are doing their home work or if they are something the students does not understand they can try and solve their problems by themselves. Below is a list for the fourth grade multiplication and division section.

**dividend** In the division fact  $35/7=5$  the number 35 is the dividend

**divisor** The divisor is the number you are dividing by

**factors** The numbers being multiplied in a multiplication number model. In the number model  $4 \times 3 = 12$ , 4 and 3 are the factors.

**fact family** A collection of related addition and subtraction facts, or multiplication and division facts, made from the same numbers. For the numbers 2, 5 and 7, the family consists of  $2 + 5 = 7$ ,  $5 + 2 = 7$ ,  $7 - 5 = 2$ ,  $7 - 2 = 5$ . for the numbers 3, 5 and 15, the family consists of  $3 \times 5 = 15$ ,  $5 \times 3 = 15$ ,  $15 \div 3 = 5$ , and  $15 \div 5 = 3$ .

**false number sentence** Is when a teacher put the wrong problem on the board and the children need to find the solution

**logic grid** Keeps track of the information in the problem

**multiplication facts** Basic fact of multiplication

**number model** Problems such as  $5+8=13$ ,  $5<7$  are shorthand for sentences written in words

**number sentence** Same as number model

**open sentence** A sentence that has a variable in it, such as  $10+X=15$

**percent, %** Per hundred; time  $1/100$ ; times 0.01; 1 one-hundredth part. 15% means  $15/100$  or 0.15 of a number.

**quotient** Is the answer for a division problem

**remainder** Is used when there is anything left over after you have completed your division problem

**square numbers**

**solution of an open number sentence** Solving for the value of a variable

turn around facts When the student takes a problem like  $4 \times 3$  and turns the problem around to read  $3 \times 4$

true number sentence Opposite of a false number sentence

variable A letter that stands for a missing number

In the above vocabulary list there are many repeated words. These words are needed for the students to understand and learn while continuing their education. The same old question always comes out. What's wrong with the old traditional way of multiplication and division. These students begin using traditional multiplication and division, by multiplying single digit numbers. Is this method the best way? As our students leave fourth grade they have gone through two different textbooks with about seven units each. Students again have focused on too much material. Some of these material students might not see again until their first years of high school.

When these students enter fifth grade they have learned three different methods of multiplication and only one method of division. When students begin fifth grade they will review material learned in fourth grade and continue with Lattice Multiplication and Partial Product Methods of multiplication. I am still a bit puzzled on the Lattice Multiplication. Everyday Mathematics preference for the use of fast addition in Lattice Multiplication since it does not appear to be the recommended method in Everyday Mathematics in the cleaner context of adding up a set of numbers written above one another. During fifth grade students continue working with arrays, factors, percents and word problems. They will also be introduced to a number of new topics such as:

- Number Theory
- Estimation and Calculation
- Geometry Explorations and the American Tour Fractions, Decimals, and Percents
- Collecting and Working with Data
- Division, Ratios, and Exponential Notation Coordinates, Areas, and Circles
- Algebra Concepts and Skills
- Fractions and Ratios
- Volume
- Fraction Multiplication, Percents and Rates

All of the above topics are again very important, but does a fifth grade student need to learn about volume? This is another example of the spiral effect of Everyday Mathematics. The introduction to volume was in third grade and the student might not have achieved the whole concept so we'll teach the concept over again. I have students in my sixth and seventh grade class that will say "I've heard of that" or "I remember doing that back in third grade, but I can't remember how to do it". All of

my students have heard of something, but all most none of them can remember how to use the information they have been taught. I have many fifth grade students entering the sixth grade that have trouble completing basic single digit multiplication and will not even attempt a division problem. Some of my students think of division as a horrible monster. After looking at the Everyday Mathematics series there is not much about division. Students only learn two different forms of division. In the Partial Quotients Method students have to estimate their answers, the only problem is if this student does not know how to multiply they will have trouble completing this concept. They could complete the concept by estimating a little at a time, but this will take the student a long time to completing the problem. Is this a better concept than the traditional concept of division?

As I said previously my sixth grade students are afraid to work on any division problem, and most of the students I teach use lattice multiplication. I also have students that use the traditional methods to complete both concepts. I encourage my students to use the method that gets them the right answer.

As my sixth grade students enter the sixth grade my students take a basic skills test that is given on the computer. This is a pre-test of some concepts that students learn in their elementary years. The sixth and seventh grade curriculum grade is called Connected Mathematics. This curriculum again follows the spiral concept of learning just as Everyday Mathematics. The sixth grade starts this curriculum in a book called Primetime. In the prime time book students will work on prime and composite numbers, factors, multiplies and prime factorization of numbers. Most of these concepts are a review from third, fourth and fifth grade. Many of the students that I teach have trouble with this book, because of their lack of knowledge in multiplication and division. My first year teaching this curriculum my student struggled completing multiplication and division problems. Although, this was about four years ago and the Everyday Mathematics curriculum was just starting. As the years of Everyday Mathematics continued the students continued to grow with the curriculum and some of my students are coming into sixth grade with a great knowledge of multiplication and division. But, there are still a great deal of my students that have trouble with both multiplication and division. A number of my students still rely on a calculator and a multiplication fact table. Sixth graders deal with a number of concepts that require the understanding of basic multiplication and division. Students in sixth grade need to be able to find a common denominator or identify the area of a rectangle and triangle also there are a number of problems that require the use of multiples. When a student doesn't enter sixth grade with the required tools. How is this child supposed to learn? As these children leave sixth grade and enter seventh grade they many have not achieved the concepts of multiplication and division. Where and when does the spiral effect to take place? Are these students supposed to wake up one day and all the information will be right there in their minds. As these students enter the seventh grade the need for a background with multiplication and division are at an even greater need. In seventh

grade these same students are required to follow number patterns, find the scale factor of two given shapes, add/ subtract/ multiply and divide integers, and be able to find the area of a circle or a rectangular prism. All students get a calculator and many use the calculator, but some of my students can multiply the length x width x height by just looking at the numbers. My students are encouraged to use what they know and try not to use the calculator. There are many times when a calculator will not be available. As I had mentioned earlier multiplication and division are a very important concept for a child to learn.

## **OBJECTIVE**

### Third Grade

Introduce Multiplication, Factors, and Baseball Multiplication, using tables for the 1- to 6 facts.

Introduce and use map scales for estimating the direct distance between two places; estimate distances on a U.S. map by using an edge of a sheet of paper or a length of string and then convert to actual distances.

Use relation symbols and parentheses; solve open sentences; compare the use of punctuation in English sentences to the use of parentheses in mathematics sentence; learn how parentheses are used to specify which operation to do first in a number sentence.

### Fourth Grade

Extend a basic fact such as  $3 \times 4$  in products of ones and tens ( $3 \times 40$  or  $30 \times 4$ ) and products of tens and tens ( $30 \times 40$ ); play Multiplication wrestling and Beat the Calculator to practice solving extended facts.

Estimate the lengths of nonlinear paths draw on a square grid by counting grid squares or counting the number of compass swings needed to reach the other end of the path.

Measure mammals in drawings and use a scale to determine their actual sizes.

Make a scale drawing of the classroom.

### Fifth Grade

Increase speed and accuracy with multiplication facts.

Review the use of a map scale; review methods for measuring distance on a map; use two scales to assemble a model of the solar system.

Introduce a pan-balance approach for solving simple equations; transform a complex equation into a succession of simpler equivalent equations; introduce the relation symbols (not equal to), (greater than or equal to) and (less than or equal to); introduce an order of operations for solving number sentences without parentheses.

## **STRATEGIES**

Everyday Mathematics uses a spiral concept. The spiral concept is taught by introducing new topics or concepts. Students will work on these concepts for a few weeks. After a few weeks of teaching one concept the teacher will move on and introduce a new concept. The concept that had previously been taught will be revisited at another time during the Unit.

Teaching these concept should be viewed by the students as a fun activity. Many of the lessons involve game playing and small group work. In Everyday Mathematics students learn various ways to work on multiplication and division. Everyday Mathematics offers four methods for dealing with multiplication: The Partial Product Method, Lattice Multiplication Method, Egyptian Multiplication Method, and The Short Method. Everyday Mathematics offers two different methods for division:

The Partial Quotients Method and Column Division Method. The traditional method of long division is not taught. Begin a middle school teach and teaching student who have gone through the Everyday Mathematics curriculum I have noticed most of my students' are more comfortable with Lattice Multiplication and Partial Quotients Methods.

One of the main strategies of Everyday Mathematics is to make learning enjoyable for the students. During the students third grade year the students are introduce Baseball Multiplication. Baseball Multiplication is a game in which students refine the concept of multiplication. This game will follow the students thought out their elementary school years. Another game student will play is Broken Calculator: Number Keys and Broken Calculator: Operation Keys. Students will also play a spin off of Multiplication Baseball and this game is Multiplication Wrestling. In Multiplication Wrestling student are introduced to the concept of two-digit multiplication. Students refine their skills in multiplication by playing these games. Students enjoy playing the games and they making learning fun for the students.

The sixth and seventh grade curriculum also has a strong presence of games and small group work. In sixth grade students play the Product Game and the Factor Game. Each of these games deals with a multiplication. The Product Game is a main focus of the first sixth grade book. Students need to have a strong background in multiplication to achieve at this game. When students play the Factor Game the students again need a strong framework of multiplication. Students often have trouble playing these games because they lack the framework for success. When students play these games they want to play with their friends. The friend they chose to play with may have a strong background in multiplication. Thus, most times the weaker student does not have success and just gives up, showing no interest in the game or multiplication. Students are often asked to take these games home and play with their parents. Most times the students will forget the games in their lockers or their parents are working and students often forget to ask them to play. If this curriculum is going to work teachers need the help of the parents. Parents are important because they are the ones helping the students complete their homework and continuing on with the student's practice of their concepts.

## **ACTIVITIES**

The sample activities that I suggest in teaching these concepts are: Baseball Multiplication, Broken Calculator Number Keys, Broken Calculator Operation Keys, Multiplication Wrestling and Multiplication Bulls Eye:

### **Baseball Multiplication**

The materials are 2,3, or 4 six-sided dice or a number card deck. A baseball diamond, four pennies, a score board and a multiplication table or calculator. Students draw a baseball diamond and players take turns being the pitcher and the batter. The pitcher roll the dice or draws cards from the number card deck. The batter multiplies the numbers and tells the answer. The pitcher checks the answer in a multiplication table or on a calculator. If the answer is wrong the play is an out. If the answer is correct, the batter looks it up in a Hitting Table. If the product earns a hit, the batter moves all the pennies on the bases. If the play is not a hit it's an out. A run is scored each time a penny crosses home plate. A player remains the batter for three outs. Then player switch roles. The inning is over when both players have made three outs. After making the third out, a batter records the number of runs scored in that inning on the scoreboard. The player who has more runs at the end of four innings wins the game. If the game is tied at the end of four innings, play continues into extra innings until one player wins. There are many concept of Baseball Multiplication there games with factors of 1 to 6, factors of 1 to 10, factors of 2 to 12 and even a three factor game in which three dice are used.

### Broken Calculator: Number Keys

The only material for the game is a calculator. Two players are needed for the game. Partners pretend that one of the number keys is broken. One partner says a number and the other tries to display it on the calculator without using the broken key. An example might be, if the eight key is broken the player can display the number 18 by pressing  $9 + 7 + 2$  or  $9 \times 2$ . A player's score is the number of keys entered to obtain the goal. Scores for five rounds are totaled. The player with the lowest total wins.

### Broken Calculator: Operation Keys

This version is played the same as Broken Calculator: Number Keys, except partners pretend that one of the operations keys is broken. One partner says an open sentence, and the other tries to solve it on the calculator without using the broken key. Pretend the  $-$  key is broken. What is the solution to the open sentence  $650 + x = 750$ .

Player will use their estimation skill to find a solution to the problem. The player who has the least number of guesses gets the point.

### Multiplication Wrestling

The materials needed for the game is one deck of 0 – 9 number cards, four of each number card. Two players are needed to play the game. The object of the game is to get the largest product of two-digit numbers. Shuffle the deck of card and place them facedown. Each player draws four cards and forms a two-digit number. There are many possible combinations of two-digit numbers. Each player must pick a pair of numbers to use so that the problem will give him or her the highest product. Each player creates two wrestling teams by writing each number as a sum of tens and ones.

	Player 1		Player 2		
75	x	84	64	x	91
Team 1		Team 2	Team 1		Team 2
(70+5)		(80+4)	(60+4)		(90+1)

Next, each player's two wrestling teams wrestle each other in this way: Each member of the first team is multiplied by each member of the second team: For example (70 and 5) is multiplied by each member of the second team: (80 and 4). Then the four products are added. The player with the largest result wins the round.

To find the winner's score, subtract the loser's result from the winner's result and record the difference on a score sheet. Players may use a calculator to find the winner's score for a round and their total for the game. They may also use a calculator to check a player's score for a round by multiplying the two numbers. Multiplication Wrestling is used to get students ready for Partial Product Method of multiplication.

### Multiplication Bulls Eye

This game requires number cards (four each of the numbers 0 through nine), a six sided die and a calculator. Two students can play the game. The players will shuffle the cards and place them facedown on the playing surface. Players take turns, at each turn the players roll the die. They will look up the target range of the product in the table.

Number on die	Target range of product
1	500 or less
2	501 – 1000
3	1001- 3000
4	3001 – 5000
5	5001 – 7000
6	More than 7000

Take four cards from the top of the deck. Use the cards to try to form two numbers whose product falls within the target range. Do not use a calculator. You need not use all four cards. A number may not begin with zero. Multiply the two numbers on your calculator to determine whether the target ranges. If it does, you have hit the bull's – eye and score a point. If it doesn't you score zero points. The game ends when each player has had five turns. The player who has scored the most points wins the game.

There are also games in the sixth and seventh grade curriculum. These games deal with multiplication and the students knowing factors. These games are also used to reinforce learning. In sixth grade the students will play The Product Game and The Factor Game. In seventh grade the students will play the Product Game again only this time the students will use integers.

### The Product Game

The only materials needed for the Product game are the game board and two paper clips. Students play this game in groups of two. The student who has the first move will place a paper clip on a factor. The next player will place their paper clip

on another factor. Player two must use the two factors and make a product on the game board.

The player that connects four products in a row or diagonal wins the game.

### The Factor Game

The only materials needed for this game is a Factor Game board. The game board is numbered 1 to 30. Students can play the game in groups of two. The first student will choose a product, this student receives the points the product is worth. The second player must find all the factors of the product chosen. After the player has found the factors they will add up the total and get those points. If the player two misses a factor player one can claim their points. The game is over when there are no factors or product left to be chosen.

### Integer Product Game

The Integer Product Game is a seventh grade game played during the unit on negative and positive numbers. This game is a spin off of the sixth grade product game.

The game is played the same way only this time players must use integers.

Everyday Mathematics uses these games to help the students learn the concepts of multiplication and division. By playing these games the students can reinforce their skills in multiplication and division. Students need to have knowledge of multiplication and division to play these games. These games are a great tool students can use, the only draw back to game playing is the students need to stay on task. Some students are easily pulled off task and can not concentrate on the task at hand. Classroom management is the key to children playing these games.

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